

# **Innovative Nuclear Engineering Materials and Corrosion Modules for Enhancement and Expansion of the U.S. Nuclear Engineering Educational Infrastructure**

## **Executive Summary**

The educational materials development project which is proposed herein will be performed through collaboration between the University of Kansas and Kansas State University personnel. In the major portion of the project, the principal investigators will design, implement, and assess 30 online stand-alone [and combinable] lesson modules on materials selection and corrosion, specifically for nuclear engineering (NE) applications. The 30 versatile modules proposed herein are designed to help the Big-12 Engineering Consortium (EC) reach its goals and objectives, which are to supply a significant number of new well-trained engineers to the nuclear industry and provide working professional engineers with the skills needed by the nuclear industry as it enjoys renewed interest/activity. This resurgence has been driven by concern that fossil fuels are one of the major sources of emissions which are causing climate changes, balanced by the fact that nuclear resources can help to mitigate these changes by providing large amounts of reliable energy with minimal greenhouse gas production. However, due to the fact that U.S. nuclear power plant construction has been essentially dormant for the past 30 years, it is necessary to attract many more engineering students to the field and maintain training of professionals already working in the field.

Each of the proposed modules will be 2.5 hours long and can be combined in a variety of ways to yield larger learning segments – from day-long workshops to 3-credit hour university courses. Each learning module will have its own interactive problems/questions in order to insure that learners have a variety of modes through which to understand the material. Since the format will be a virtual classroom, students can re-visit that material as needed. In addition, selected modules will be used by practicing engineers to gain targeted knowledge and for continuing education credit. Once developed, these modules will be straightforward to update and, therefore, will be usable and applicable for many years to come, as the University of Kansas and the Big-12 EC continue to teach/manage/update the modules. In addition, these modules will be the pilot program for the development of many similarly designed learning modules to cover a wide range of NE-related topics.

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